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THE WORK IN 1918 [redacted] THE NEWLANDS (FORMERLY THE TRUCKEE-CARSON) RECLAMATION PROJECT EXPERIMENT FARM

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AGRICULTURAL CONDITIONS ON THE PROJECT.

CROP PRODUCTION AND VALUES.

In 1918 the total area under cultivation on the Newlands Reclamation Project was increased 4.8 per cent (from 40,392 acres to 42,311 acres, an increase of 1,919 acres). The area in alfalfa was increased from 20,360 to 21,542 acres, an increase of 1,182 acres, or 5.8 per cent. There was a small increase in the area devoted to barley, oats, and potatoes, but the wheat acreage was practically double that of the previous year. This marked increase in the production of wheat is undoubtedly the result of the closing of the sugar-beet factory, which released more than 2,000 acres of beet land.

Although only 60 per cent of the total cropped area is devoted to alfalfa, the value of this crop is nearly $3\frac{1}{2}$ times that of all other crops combined. The average gross income per acre has been increased very materially during the last three years as a result of the increased farm values of crops. The average values of farm products per acre from 1912 to 1918, inclusive, have been as follows:

Average values of farm products per acre on the Newlands Reclamation Project for the 7-year period from 1912 to 1918, inclusive.

1912	$12.83	1916	$20.11
1913	12.92	1917	35.80
1914	11.22	1918	38.43
1915	15.39		

Table I was prepared from statistics presented in the annual report of the United States Reclamation Service. It gives the acreage, yields, and farm values of the crops produced on the Newlands Reclamation Project during 1918.

TABLE I.—*Acreage, yields, and farm values of crops produced on the Newlands Reclamation Project in 1918.*

Crop.	Area. (acres).	Unit of yield.	Yields.		Farm values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Average per acre.
Alfalfa hay	21,542	Ton	77,442	3.6	$16.00	$1,239,072	$77.44
Alfalfa (planted in 1918)	3,725	do	932	.3	16.00	14,912	4.00
Barley	1,374	Bushel	35,333	25.7	1.08	38,160	27.77
Oats	44	do	1,856	42.2	.80	1,485	42.84
Wheat	5,024	do	98,800	19.7	1.80	177,840	35.40
Potatoes	334	do	50,833	152.2	.75	38,125	114.15
Hay (except alfalfa)	1,124	Ton	1,156	1.0	14.00	16,184	14.31
Garden and miscellaneous crops	632	do				43,993	69.50
Pasture:							
Alfalfa						36,139	
All others	9,662					20,140	2.08
Irrigated without crop	821						
Less duplications	1,971						
Total	42,311					1,626,050	
Per acre							38.43

Table II compares the production of various crops for a series of years. The acreage of alfalfa has increased annually, while the acreage of other crops has fluctuated from year to year.

TABLE II.—*Acreage and production of leading crops on the Newlands Reclamation Project for the 7-year period from 1912 to 1918, inclusive.*

Year.	Alfalfa.		Barley.		Oats.		Wheat.		Potatoes.	
	Acres.	Tons.	Acres.	Bushels.	Acres.	Bushels.	Acres.	Bushels.	Acres.	Bushels.
1912	12,912	33,595	2,259	74,792	399	16,875	2,484	40,600	483	65,633
1913	13,960	45,132	1,880	43,238	283	19,274	1,590	30,271	416	29,789
1914	13,212	59,873	1,329	31,084	417	18,000	1,446	29,164	283	23,800
1915	18,273	53,496	1,733	49,585	428	14,375	2,582	54,065	196	25,133
1916	19,541	61,755	1,658	52,000	107	4,566	2,861	57,733	177	29,400
1917	20,360	72,769	1,116	26,833	27	938	2,532	43,233	322	56,433
1918	21,542	77,442	1,374	35,333	44	1,856	5,024	98,800	334	50,833

LIVE-STOCK PRODUCTION.

The number and the estimated value of live stock on the project in 1918 are given in Table III. There has been a small increase in the number of horses, mules, beef cattle, sheep, and hogs, but the number of dairy cattle, turkeys, poultry, and bees has decreased.

The high price and good profits to be made from alfalfa hay and the high price paid for beef, together with the closing of the local creamery in April, contributed to the dissatisfaction of the dairymen and resulted in the disposal of many dairy animals. According

to the observations of Mr. L. E. Cline, the animals thus disposed of were mostly the inferior cows, the best cows being retained in the herds or sold as dairy animals to other farmers within the project. This weeding out of the poorer cows, as the result of economic conditions during the war, may eventually result in the propagation of superior dairy herds.

The marked decrease in the number of poultry was associated with the increased cost and scarcity of available feeds.

TABLE III.—*Number and estimated value of live stock on the Newlands Reclamation Project in 1918.*

Item.	Inventory, Dec. 31—		Increase in number.	Decrease in number.	1917		1918		Increase in value.	Decrease in value.
	1917. Number.	1918. Number.			Unit value.	Total value.	Unit value.	Total value.		
Horses	3,155	3,394	239	.....	$79.48	$250,773	$79.25	$268,990	$18,217	.....
Mules	312	340	28	.....	87.95	27,400	76.47	26,000	.....	$1,440
Cattle:										
Dairy	2,044	1,895	.....	149	87.15	178,145	91.71	173,785	.....	4,360
Other	7,581	8,839	1,258	.....	36.01	273,021	42.51	375,790	102,769	.....
Sheep	3,346	3,560	214	.....	11.73	39,258	10.80	38,464	.....	794
Hogs	3,170	3,343	173	.....	14.45	45,897	15.01	50,194	4,297	.....
Fowls:										
Turkeys	9,042	4,746	.....	4,296	2.95	26,633	3.15	14,928	.....	11,705
All other	24,056	20,220	.....	3,836	.68	16,419	.92	18,538	2,119	.....
Bees, hives	1,933	1,589	.....	344	5.84	111,294	13.23	21,092	9,735	.....
Total	.....	.....	.....	.....	.....	868,880	.....	987,718	137,137	18,299
Net increase in value	.....	.....	.....	.....	.....	.....	.....	.....	118,838	.....

WEATHER CONDITIONS.

Weather records are kept in cooperation with the United States Weather Bureau, the Biophysical Laboratory of the Bureau of Plant Industry, the University of Nevada, and with private individuals as follows: H. M. Carter, superintendent of the Fallon Indian School; T. V. Conner, of the Island district; C. G. Swingle, of the Swingle Bench; W. W. Cogswell, of the Fernley Bench; and J. D. Oliver, superintendent of the Indian School at Pyramid Lake.

GENERAL SUMMARY.

The weather during the growing season of 1918 was about normal, the only exception being the date of the last killing frost, October 7, which was later than had been previously recorded. There was a frost-free period of 131 days, 8 days longer than normal, which made the season especially favorable for garden crops and corn. The total precipitation was 6.23 inches, which is about 25 per cent greater than normal. The observations for the year 1918 and the average of all years since observations were begun are presented in Table IV.

TABLE IV.—*Summary of climatological observations at the Newlands Experiment Farm 1906 to 1918, inclusive.*

PRECIPITATION (INCHES).

Year, etc.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Average for 13 years [1]	0.87	0.43	0.41	0.57	0.46	0.37	0.21	0.18	0.38	0.37	0.25	0.47	4.97
For the year 1918	.17	.51	.62	.84	.28	.82	.44	.00	1.30	.62	.23	.40	6.23

EVAPORATION (INCHES).

Average for 11 years [2]	1.29	1.82	4.17	6.20	8.17	9.96	10.79	9.72	6.55	3.93	2.09	.97	65.66
For the year 1918	1.37	2.03	4.33	6.75	8.88	10.10	10.98	9.48	6.15	3.96	1.74	.87	66.64

DAILY WIND VELOCITY (MILES PER HOUR).

Average for 10 years [3]	3.4	3.8	4.7	5.4	5.0	4.3	3.4	3.1	3.1	2.8	2.9	2.8	3.7
For the year 1918	2.9	4.7	4.5	4.2	4.6	2.9	2.6	2.4	2.2	2.0	2.2	1.4	3.1

ASPECT OF THE SKY (DAYS).

Average for 13 years: [4]													
Clear	12.3	13.4	18.3	18.6	17.9	22.2	22.8	24.8	22.4	23.3	17.8	14.4	228.2
Partly cloudy	9.9	7.5	7.6	6.9	8.8	4.5	5.4	3.8	3.8	2.8	5.8	6.9	73.7
Cloudy	8.8	7.3	5.1	4.5	4.3	3.3	2.8	2.4	3.8	4.9	6.4	9.7	63.3
For the year 1918:													
Clear	11	14	20	18	18	14	21	20	13	21	15	20	205
Partly cloudy	14	3	4	9	10	11	5	8	4	2	6	5	81
Cloudy	6	11	7	3	3	5	5	3	13	8	9	6	79

TEMPERATURE (° F.).

Year, etc.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Average for 13 years: [5]												
Absolute maximum	57.5	63.8	74	81	87.2	95.2	99.8	98.6	91.8	83.2	72.9	61.2
Mean maximum	42.8	49.5	58.9	66.5	71.7	83	92.6	91.2	80.2	68.2	55.7	44.5
Absolute minimum	−0.4	6.9	16.3	20.8	28	36.5	44.1	40.9	30	20.5	9.9	4
Mean minimum	17.7	23	28	34.9	40.1	47.5	54.2	51.7	43	33.2	24.2	18.8
Mean	30.1	36.5	43.4	50.7	55.9	65.3	73.3	71.4	61.4	50.7	40.6	31.5
13-year record:												
Highest	70	72	79	89	102	101	105	103	95	89	81	72
Lowest	−25	−12	9	13	21	32	38	36	26	15	−1	−3
For the year 1918:												
Absolute maximum	61	64	73	80	86	99	98	97	92	84	70	64
Mean maximum	47.2	49.1	58.6	64.4	71.3	91.8	92.4	88.6	79.9	69	51	41
Absolute minimum	4	4	16	15	32	36	45	39	36	21	10	−2
Mean minimum	17.5	21.5	29.8	32.7	38.7	53.5	54.2	50.7	46.6	37.8	24.2	14.7
Mean	32.3	35.3	44.2	48.6	55.0	72.6	73.3	69.7	63.3	53.4	37.6	27.8

KILLING FROSTS.

Year.	Last in spring.	First in autumn.	Frost-free period.	Year.	Last in spring.	First in autumn.	Frost-free period.
			Days.				*Days.*
1906	May 31	Oct. 4	126	1914	Apr. 24	Sept. 9	138
1907	May 14	Sept. 19	128	1915	May 20	Sept. 14	117
1908	May 30	Sept. 25	118	1916	June 1	Sept. 10	101
1909	May 24	Sept. 22	121	1917	May 21	Sept. 25	127
1910	May 16	Sept. 13	120	1918	May 29	Oct. 7	131
1911	May 27	Sept. 18	114				
1912	May 22	Sept. 25	126	Average	May 21	Sept. 21	123
1913	May 13	Sept. 23	133				

[1] January, February, and March, 12 years.
[2] January, February, March, April, and November, 9 years.
[3] January and February, 8 years; March, 10 years.
[4] January, February, March, and October, 12 years.
[5] March and October, 12 years.

TEMPERATURE SURVEY OF THE PROJECT.

A temperature survey of the project has now been conducted for a period of three years with thermographs stationed as follows: (1) Fallon Indian School, 10 miles east of Fallon, altitude 3,915 feet; (2) farm of T. V. Conner, 9 miles south of Fallon, altitude 3,930 feet; (3) United States Experiment Farm, 1 mile south of Fallon, altitude 3,970 feet; (4) farm of C. G. Swingle, 14 miles west of Fallon, altitude 4,084 feet; (5) farm of W. W. Cogswell, 5 miles east of Fernley, altitude 4,180 feet; and (6) the United States Indian Reservation at Pyramid Lake.

The records are being made for the purpose of studying the effect of topography on temperature. A comparison of the minimum temperatures is of special interest, because the character of the agriculture and the kind of crops grown may be decidedly changed by a difference of a few degrees in the mean minimum temperatures, especially during the critical months of May and September.

In Table V the average mean minimum and the average absolute minimum temperatures of the low lands and high lands are compared for a period of three years. The low lands are represented by the Fallon, Island, and Fallon Indian School stations, and the high lands by the stations located on the Fernley and Swingle Benches. The temperatures of the Pyramid Lake region are not included in this table, for the reason that the temperatures at that station are evidently modified by the lake or by other factors which are independent of relative altitude.

TABLE V.—*Comparison of the minimum temperatures on the Newlands Reclamation Project for the 3-year period, 1916, 1917, and 1918.*

Month.	Mean of the mean minimum temperatures for three years.			Mean of the absolute minimum temperatures for three years.		
	High lands.	Low lands.	Difference in favor of the high lands.	High lands.	Low lands.	Difference in favor of the high lands.
	° *F.*	° *F.*	° *F.*	° *F.*	° *F.*	° *F.*
January	13.9	10.1	3.8	−8.8	−16.3	7.5
February	21.4	21.4	2.7	.3	− 5.5	5.8
March	29.7	27.1	2.6	18.3	14.2	4.1
April	35.7	32.4	3.3	22.7	17.6	5.1
May	41.0	38.6	2.4	30.7	27.3	3.4
June	52.1	46.9	5.2	37.3	33.4	3.9
July	59.1	54.4	4.7	48.5	44.6	3.9
August	56.7	51.5	5.2	44.8	41.3	3.5
September	50.3	44.3	6.0	36.8	31.8	5.0
October	38.4	34.0	4.4	23.8	19.7	4.1
November	26.4	23.4	3.0	12.2	9.0	3.2
December	21.3	17.1	4.2	7.3	4.5	2.8
Average	.....	.....	4.0	.....	.....	4.4

Table V shows that the higher altitudes have a decided advantage in the matter of minimum temperatures, the mean minimum averaging 4 degrees and the absolute minimum 4.4 degrees in favor of the high lands. The results obtained during the three years of the tests have been very consistent in indicating that the higher altitudes of the project have a decided advantage in the matter of minimum temperatures. This conclusion is supported by observation, for it is noticeable that on the Swingle and Fernley Benches the last spring frosts do not occur so late nor the autumn frosts so early as on the main part of the project in the vicinity of Fallon.

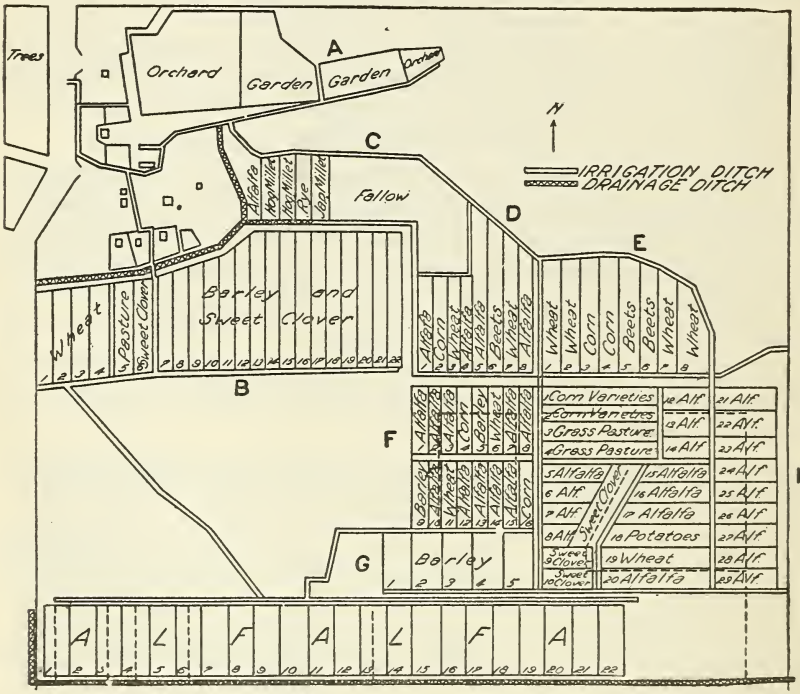

FIG.—Diagram showing the arrangement of the fields and the location of the experiments at the Newlands Experiment Farm in 1918.

CHARACTER OF THE WORK IN PROGRESS.

The work of the Newlands Experiment Farm consists of (1) recording the weather conditions at the experiment farm and on private farms located in representative sections of the project; (2) variety tests of general farm crops, conducted partly on private farms; (3) variety tests of horticultural crops; (4) field experiments in the reclamation of alkali soils; and (5) laboratory work relating to the field experiments in the reclamation of alkali soils. (Fig. 1.)

VARIETAL AND CULTURAL TESTS OF FIELD CROPS.

BARLEY VARIETY TESTS.

Seven varieties of barley were planted on April 5 and 6 on the farm of Fred Sander. With the exception of a variety purchased locally and designated in the test as "Check," all varieties were grown from the test of the previous year. The seed was drilled at the rate of about 8 pecks per acre. The soil on which the varieties were grown had been in alfalfa the previous year, and a fairly strong stand of alfalfa appeared in the varieties, but this did not interfere with the harvesting nor did it noticeably affect the yield. The soil was a sandy loam and somewhat more uniform in character than that on which the tests of previous years were grown. The varieties were harvested on July 15 and allowed to stand in shock until August 11, when they were thrashed. The area of the plants and the actual yields are given in Table VI.

TABLE VI.—*Yields of seven varieties of barley on the Newlands Reclamation Project in 1918 compared with yields in previous years.*

SERIES OF TESTS IN 1918.

Plat.	Variety.	Area (acre).	Actual yield.	Yield per acre.		Plat.	Variety.	Area (acre).	Actual yield.	Yield per acre.	
				Pounds.	Bushels.					Pounds.	Bushels.
Series I:						Series II:					
No. 1	Check.....	0.28	314	1,121	23.4	No. 11	Chevalier .	0.18	332	1,844	38.4
No. 2	Chevalier..	.28	450	1,607	33.5	No. 12	Coast.....	.18	448	2,489	51.9
No. 3	Coast.....	.29	691	2,383	49.6	No. 13	Check.....	.18	342	1,900	39.6
No. 4	Check.....	.29	493	1,700	35.4	No. 14	Nepal.....	.18	264	1,467	30.6
No. 5	Nepal.....	.29	485	1,672	34.8	No. 15	Hannchen.	.18	265	1,472	30.7
No. 6	Hannchen..	.28	509	1,818	37.9	No. 16	Check.....	.18	260	1,444	30.1
No. 7	Check.....	.28	368	1,314	27.4	No. 17	Svanhals..	.18	323	1,794	37.4
No. 8	Svanhals...	.28	434	1,550	32.3	No. 18	Trebi.....	.17	313	1,841	38.4
No. 9	Trebi.....	.27	540	2,000	41.7	No. 19	Check.....	.16	212	1,325	27.6
No. 10	Check.....	.18	350	1,944	40.5						

SUMMARY OF TESTS, SHOWING VARIETAL RANK.

Series of 1918.						Tests during the 4-year period from 1915 to 1918, inclusive.							
Rank.	Variety.	Yield per acre (pounds).		Average per acre.		Rank.	Variety.	Yield per acre. (pounds).				Four-year average.	
		Series I.	Series II.	Pounds.	Bushels.			1915	1916	1917	1918	Pounds.	Bushels.
1...	Coast.....	2,383	2,489	2,436	50.8	1..	Coast.....	2,040	1,765	979	2,436	1,805	37.6
2...	Trebi.....	2,000	1,841	1,920	40.0	2..	Trebi.....	.....	.....	1,135	1,920	1,530	31.9
3...	Chevalier...	1,607	1,844	1,726	36.0	3..	Check.....	1,435	1,916	1,010	1,535	1,474	30.7
4...	Svanhals...	1,550	1,794	1,672	34.8	4..	Hannchen...	1,581	1,456	1,040	1,645	1,431	29.8
5...	Hannchen .	1,818	1,472	1,645	34.3	5..	Chevalier....	....	1,504	833	1,726	1,354	28.2
6...	Nepal.....	1,672	1,467	1,570	32.7	6..	Svanhals....	1,435	1,408	842	1,672	1,339	27.9
7...	Check.....	.....	.....	1,535	32.0	7..	Nepal.....	1,218	1,292	510	1,570	1,148	23.9

The average yields for four years are also summarized in the table. It will be seen that the relative rank of the varieties for the series of

years is but slightly changed from that given for the year 1918. The Coast variety is undoubtedly the one best adapted to the conditions on the Newlands Reclamation Project.

CORN VARIETY TESTS.

Twelve varieties or strains of corn were planted in drills with a horse planter on May 13 on plats H–1 and H–2 on the experiment farm. Seed of Minnesota No. 13 was planted every fourth row as a check, and all other varieties were planted in duplicate. All varieties were mature by September 20 and were harvested by husking the standing corn.

The seed of some varieties did not germinate well, and the stand obtained was very irregular, so that it is safe to compare the yields of only those varieties which had a nearly perfect stand. Judging from the results obtained during a series of years it seems that the Australian White Flint, Wimples Yellow Dent, and Minnesota No. 13 are best adapted to the project when ear corn is desired.

WHEAT VARIETY TESTS.

The wheat variety tests were conducted on the farm of Fred Sander, located about 5 miles southeast of Fallon. Nine varieties were included in the experiment, with a local variety used as a check in one of the series. All varieties were planted in duplicate. In Series I seed furnished by Mr. Sander was used as a check by planting in every third plat. This variety is designated in Table VII as "Local." In Series II a variety, the Early Baart, which had not been previously included in the tests was planted on every third plat as a check. A border of two drill widths of the local variety was seeded around the entire field and was cut out before harvest. The drill was set to seed about 90 pounds per acre. The date of seeding was April 3 on Series I and March 27 on Series II. The harvesting of the plats was begun on July 15 and the thrashing was from the shock on August 8. The actual yields obtained are given in Table VII.

Table VII also shows the yields of eight varieties of wheat for the four years, 1915 to 1918, inclusive. The varieties are arranged in the order of rank. It will be noted that the Little Club variety had higher yields each year than any of the other varieties. In so far as production is concerned this variety may therefore be considered the most profitable to grow provided it can be marketed at the same price as the better milling varieties.

TABLE VII.—*Yields of wheat varieties on the Newlands Reclamation Project in 1918 compared with yields in previous years.*

SERIES OF TESTS IN 1918.

Variety.	Series I.			Series II.			Total.		Average yield per acre.	
	Area	Actual yield.	Yield per acre.	Area.	Actual yield.	Yield per acre.	Area.	Actual yield.	Pounds.	Bushels.
	Acres.	*Pounds.*	*Pounds.*	*Acres.*	*Pounds.*	*Pounds.*	*Acres.*	*Pounds.*		
Little Club	0.378	1,061	2,807	0.587	1,647	2,819	0.956	2,708	2,833	47.2
Baart	.272	484	1,779	2.117	5,372	2.538	2.389	5,856	2,451	40.9
Rieti	.380	800	2,105	.455	1,148	2,602	.836	1,984	2,376	39.6
Dicklow	.264	564	2,136	.480	1,152	2,400	.744	1,716	2,306	38.4
Local	1.180	2,611	2,213	.....	.....	.....	1,180	2,611	2,213	36.9
Bluestem	.371	871	2,348	.465	975	2,097	.836	1,846	2,208	36.8
Defiance	.360	705	1,958	.563	1,328	2,478	.923	2,033	2,203	36.7
Sonora	.420	864	2,057	.540	1,180	2,185	.960	2,044	2,129	35.5
Marquis	.392	641	1,635	.553	1,051	1,901	.945	1,692	1,790	29.8

SUMMARY OF TESTS FOR THE 4-YEAR PERIOD FROM 1915 TO 1918, INCLUSIVE, SHOWING VARIETAL RANK.

Rank.	Variety.	Average yields per acre (bushels).					Rank.	Variety.	Average yields per acre (bushels).				
		1915	1916	1917	1918	Average.			1915	1916	1917	1918	Average.
1...	Little Club...	45.5	52.2	50.8	47.2	48.9	5...	Sonora	40.5	37.2	46.2	35.5	39.9
2...	Rieti	42.7	48.5	45.2	39.6	44.0	6...	Marquis	37.7	40.9	51.0	29.8	39.8
3...	Dicklow	41.6	42.3	51.1	38.4	43.4	7...	Bluestem	38.5	42.1	37.2	36.8	38.7
4...	Defiance	39.0	42.8	44.3	36.7	40.7	8...	Ghirka	35.0	36.2	42.5	.....	37.9

FLAX, BUCKWHEAT, AND SUDAN GRASS.

A few rows each of flax, buckwheat, and Sudan grass, which had not been previously tested, were planted on the experiment farm in field A–3. All grew to maturity, but no attempt was made to determine the yields per acre. The Sudan grass made a rank growth to a height of 6 feet. This crop will undoubtedly be useful when an annual hay crop is desired. The buckwheat grew to a height of 30 inches, and a good crop of seed was set. Further experiments to ascertain its yield under field conditions should be made. The flax was somewhat dwarfed, but the balls were well filled with seed. Further experiments also should be made with this crop.

EXPERIMENTS WITH POTATOES.

Time of planting.—The experiment of planting potatoes at weekly intervals for a period of six weeks was conducted in a manner similar to the experiment made in 1917. One row, 345 feet long, was planted on each of the dates shown in Table VIII. The seed used was smooth Burbank. The yields reported are for the marketable tubers only.

TABLE VIII.—*Time-of-planting tests with potatoes on the Newlands Experiment Farm in 1917 and 1918.*

Tests of 1917.		Tests of 1918.		Average yield, 1917 and 1918.
Date of planting.	Yield per 100-foot row.	Date of planting.	Yield per 100-foot row.	
Apr. 19	84	Apr. 17	94	89
Apr. 26	99	Apr. 23	124	111
May 3	111	Apr. 30	86	99
May 10	86	May 7	98	92
May 17	102	May 14	75	89
May 24	72	May 21	71	72

The greatest yield was from the row planted on April 23 and the smallest yield from the row last planted. The yields of the 1917 tests are included for comparison.

Comparison of types of seed potatoes.—On the farm of C. G. Swingle plantings of potatoes were made to compare the yields obtained from (1) small and medium-sized whole potatoes, (2) whole and cut seed, and (3) selected seed with the stock seed used in the field plantings. All selections were made at harvest time in 1917. The variety used was Russet Burbank. All plantings were made with a potato planter in rows 330 feet long. The yields given are in pounds per 100-foot row. (Table IX.)

TABLE IX.—*Yields of seed potatoes per 100 foot row.*

Test No.	Kind of seed.	Length of row.	Yield.
		Feet.	*Pounds.*
1	Small tubers, planted whole	330	100
2	Medium-sized tubers, planted whole	330	120
3	Medium-sized tubers, cut	330	135
4	Seed selected for ideal size and shape, cut	330	174
5	Regular field seed, cut	330	117

No advantage was obtained in this case by planting whole seed. Medium-sized tubers yielded more than small potatoes. The selected seed yielded nearly 50 per cent more than the regular stock used. It would seem, therefore, that selection of seed from the bins would be profitable.

Variety tests of potatoes.—Three plantings of potato varieties were made in the spring of 1918—one on the experiment farm, one on the farm of E. S. Funk, near Fernley, and one on the farm of Fred Sander, near Fallon. The stand of potatoes on the farm of Mr. Sander was so poor and irregular that the crop was not weighed, as it appeared probable that the results would be misleading rather than a source of information.

The potatoes on the experiment farm were planted in good soil in the orchard, and the results are of value. On the farm of E. S.

Funk a nearly perfect stand of all varieties was obtained, but the tubers of many varieties were irregular and misshapen, owing to second growth. They were also heavily infested with eelworms, although this ground had been previously in alfalfa and had never been planted to potatoes. This is in accord with other observations indicating that alfalfa fields are often infested with the eelworm.

Eleven varieties were planted in single rows on the farm of E. S. Funk. A duplicate planting was not made, but a row of the Russet Burbank variety was planted as a check every third row.

The British Queen and Pride of Multnomah varieties made a good showing, although they were the latest of the varieties. The high rank of the Prizetaker may be due to the low yield of the adjoining check rows. This did not appear to be a desirable variety on account of a tendency to produce second growth. The smoothest potatoes were the Snow, Scotch Rose, and Colorado Pearl. The British Queen and Pride of Multnomah continued growing until killed by frost. All the other varieties matured earlier. The yields per 100-foot row are given in Table X for both farms. A production of 100 pounds per 100-foot row is equivalent to a yield per acre of 14,520 pounds, or 242 bushels, and may be considered satisfactory.

TABLE X.—*Potato variety tests on the Newlands Reclamation Project in 1918.*

Variety.	Row No.	Yield per 100-foot row (pounds).		Increase or decrease (−) from check.	
		Actual.	Normal of check variety.		
On the farm of E. S. Funk:				*Pounds.*	*Per cent.*
Check	1	59			
Prizetaker	2	101	63	38	60
Do	3	91	68	23	34
Check	4	72			
Snow	5	110	97	13	13
Pride of Multnomah	6	144	121	23	19
Check	7	146			
American Wonder (Hydes)	8	152	135	17	13
American Wonder (local)	9	91	124	−33	−27
Check	10	113			
Scotch Rose	11	125	116	9	8
Colorado Pearl	12	116	119	− 3	− 3
Check	13	122			
Russet Burbank	14	94	125	−31	−25
British Queen	15	159	127	32	25
Check	16	130			
Earliest of All	17	110	114	− 4	− 4
Check	18	99			
On the Newlands Experiment Farm:	*Rank.*				
Blue Visitor	1	186			
Producer	2	163			
Burbank	3	154			
Russet Burbank	4	133			
Irish Cobbler	5	133			
Scotch Rose	6	106			
Earliest of All	7	105			
American Wonder	8	102			

Treatment of eelworm-infested seed potatoes.—In 1917 our experiments showed that the treatment of seed potatoes by heat was de-

cidedly effective in reducing eelworm infestation in the resulting crop. A similar experiment conducted by Prof. Peter Fransden, of the University of Nevada, with treated potatoes planted in sterilized soil in pots, indicated that the treatment at 40° C. (104° F.) for 24 hours was absolutely effective in killing all the eelworms in the seed pieces, as no infestation was found in the resulting crop.

A modification of the 1917 experiment was repeated in 1918. The seed was carefully treated in an incubator electrically heated and controlled. The plantings were made on the experiment farm in plat H-18, with alternate check rows of noninfested seed.

The eelworm-infested seed did not as a rule germinate or yield so well as the noninfested seed used in the check rows. The stand was not measurably affected by any of the treatments, but there is a probability that the yield was slightly reduced by temperature treatments of 40° to 45° C. (104° to 113° F.) for a period of 12 hours or more.

The stand and yield resulting from each treatment and of the intervening check rows are shown in Table XI.

TABLE XI.—*Effect of treatment of eelworm-infested seed on the stand and yield of potatoes on the Newlands Experiment Farm in 1918.*

Test No.	Treatment of seed (temperature data in °C.).	Plants per 100-foot row.	Stand (per cent).			Yield (pounds).		
			Actual.	Average compared to adjoining checks.	Increase or decrease (—) of treated rows compared to check rows.	Per 100-foot row.	Average compared to adjoining checks.	Increase or decrease (—) of treated rows compared to check rows.
1	Check	58	77			33		
2	Infested but not treated	43	57	80	—23	27	38	—11
3	Check	63	83			42		
4	Held at 30° for 24 hours	56	75	75	0	53	37	16
5	Check	51	68			32		
6	Held at 35° for 12 hours	56	75	75	0	36	42	— 6
7	Check	62	83			51		
8	Held at 35° for 24 hours	63	84	75	9	48	45	3
9	Check	50	67			39		
10	Held at 35° for 48 hours	53	71	73	— 2	30	30	0
11	Check	59	79			20		
12	Held at 40° for 6 hours	55	73	70	3	38	21	17
13	Check	46	61			21		
14	Check	65	87			65		
15	Infested but not treated	58	77	85	— 9	51	77	—26
16	Check	63	84			88		
17	Held at 40° for 12 hours	70	93	87	5	60	101	—41
18	Check	67	89			114		
19	Held at 40° for 24 hours	63	84	92	— 8	83	113	—30
20	Check	71	95			111		
21	Held at 40° for 36 hours	65	87	93	— 6	65	130	—65
22	Check	68	91			159		
23	Held at 45° for 9 hours	58	77	88	—11	94	111	—17
24	Check	64	85			72		
25	Held at 45° for 12 hours	53	71	85	—14	20	72	—52

When the potatoes in the plat were harvested it was at once evident that the field was everywhere infested with eelworms, so that the effect of the eelworm treatments was in a large measure overcome. Sterilizing the seed does not render the resulting crops immune from further infestation. Because of this, eelworm counts are not included.

HORTICULTURAL CROPS.

TEST OF VARIETIES OF SWEET CORN.

The five varieties of sweet corn used in this test were planted in duplicate on May 13 with a horse corn drill. The Early Premo and Peep o' Day were the first varieties to be ready for use, 79 days after planting. The Country Gentleman was the latest variety, but it produced the largest yield. By planting a few rows of early, medium, and late maturing varieties, corn may be obtained for the table from the first of August until frost comes in the fall. In Table XII are given the data of this test in detail.

TABLE XII.—*Variety test of sweet corn on the Newlands Experiment Farm in 1918.*

Variety.	Date first ready for use.	Weight of ears per 100-foot row (pounds).			Average weight per ear (ounces).
		Series I.	Series II.	Average.	
Early Premo	Aug. 2	11	.....	11.0	4.2
Peep o' Day	do.	10	13	11.5	2.9
Narrow-Grained Evergreen	Aug. 19	11	14	12.5	6.1
Black Mexican	Aug. 16	13	14	13.5	4.5
Country Gentleman	Aug. 23	19	23	21.0	5.8

TEST OF VARIETIES OF STRING BEANS.

Three varieties of string beans were planted on May 23. The varieties included the Kentucky Wonder, which is a pole or climbing variety, and two bush varieties, the Stringless Green Pod and the Refugee. The Kentucky Wonder was planted in single rows 30 inches apart, and the bush varieties in double drills 12 and 30 inches apart, an average of 21 inches between single rows. In order to make the results comparable, they are calculated in the yield of green pods per area of 100 square feet.

The Kentucky Wonder was by far the best variety in regard to production, and its quality was equal to the others. The results obtained are shown in Table XIII.

TABLE XIII.—*Comparison of yields of green pods produced by three varieties of string beans on the Newlands Experiment Farm in 1918.*

Variety.	First ready for use.	Yield (pounds).	
		Per 100-foot row.	Per 100 square feet.
Kentucky Wonder	Aug. 3	85	34
Stringless Green Pod	July 2	31	18
Refugee	Aug. 13	13	8

BLOSSOMING PERIOD OF VARIETIES OF FRUIT TREES.

During the years 1916, 1917, and 1918 a record was kept of the blossoming dates of the fruit trees on the experiment farm in field A–3. In 1916 the blossoms appeared very early in the spring and as a result were caught by frost, so that the yield of fruit was small. In 1917 and 1918 the blooms appeared later and a more abundant crop was harvested. The blossoming dates during the three seasons are compared in Table XIV.

TABLE XIV.—*Blossoming dates of fruit-tree varieties on the Newlands Experiment Farm in 1916, 1917, and 1918.*

Row, tree No., and kind.	Variety.	Buds first open.		
		1916	1917	1918
Row I:				
1 (apple)	Arkansas Black	Apr. 17	May 7	Apr. 30
2 (apple)	Ben Davis	Apr. 20	...do.....	Apr. 29
3 (apple)	Akin	Apr. 17	...do.....	Apr. 30
4 (apple)	Ralls	Apr. 22	May 12	May 5
5 (apple)	Sierra	Apr. 20	May 7	Apr. 30
6 (apple)	Shackleford	Apr. 20	...do.....	Do.
7 (apple)	Babbit	Apr. 14	...do.....	Apr. 26
8 (apple)	Banana	Apr. 20	...do.....	Apr. 28
Row II:				
1 (apple)	Coos	Apr. 18	...do.....	Apr. 30
2 (apple)	Opalescent	Apr. 20	.....	May 1
3 (apple)	Yellow Bellflower	Apr. 13	May 10	Apr. 27
4 (apple)	Gano	Apr. 20	...do.....	Apr. 28
5 (apple)	Red Astrachan	Apr. 13	May 4	Apr. 26
6 (apple)	Golden Sweet	Apr. 18	May 7	May 1
7 (apple)	Mann	.....	May 1	Do.
8 (crab)	Hyslop	Apr. 13	...do.....	Apr. 28
Row III:				
2 (apple)	Wismer	Apr. 14	May 5	Do.
4 (apple)	Waxen	Apr. 13	May 6	Apr. 29
Row IV:				
1 (crab)	Transcendent	.....	Apr. 30	Apr. 19
2 (apple)	Winter Banana	Apr. 13	May 10	Apr. 30
3 (apple)	Haas	Apr. 20	...do.....	May 2
Row V:				
1 (pear)	Barry	.....	.....	Apr. 20
2 (pear)	Kieffer	.....	Apr. 25	Apr. 15
3 (pear)	Worden	.....	Apr. 30	Apr. 20
Row VI:				
1 (pear)	Eastern Beurre	.....	.....	Apr. 18
2 (plum)	Climax	.....	Apr. 20	Apr. 17
3 (prune)	Sugar	.....	Apr. 26	.....

EXPERIMENTS IN THE RECLAMATION OF ALKALI SOIL.

EFFECT OF MANURE ON CROP YIELDS.

A series of 2-year rotations to study the effect of manure in improving alkali soils was planned and the first planting made in 1917. On account of the alkali the yields in this field have always been low. During the first few seasons after leveling, sufficient salts were present in more than half of the field to prevent the germination of seeds. There has been a gradual improvement, however, and it now appears that the improvement is proceeding faster on those plats receiving manure in the rotation. The 1918 yields are shown in Table XV.

TABLE XV.—*Effect of manure on crop yields from alkali soils on the Newlands Experiment Farm in 1918.*

Plat.	Crop.	Year manured.	Unit of yield.	Yield per acre.	Percentage of increase.
No. 1	Wheat	1917	Bushel	22.8	43
No. 2	do	Not manured	do	16.0	.....
No. 3	Silage corn	1918	Ton	5.2	63
No. 4	do	Not manured	do	3.2	.....
No. 5	Mangels	do	do	9.0	.....
No. 6	do	1917	do	10.0	11
No. 7	Wheat	Not manured	Bushel	4.2	.....
No. 8	do	1918	do	11.7	179

Two other rotation experiments are in progress, designed to test the effect of 4-year and 6-year rotations in improving the alkali areas in the plats included in the rotations. These rotations were begun in 1916, but definite results can not be expected until the rotations have started on the second round.

ALKALI RECLAMATION EXPERIMENTS IN FIELD Y.

In 1914 various treatments were given to plats 1 to 18 of field Y. These treatments included the application of gypsum, sulphuric acid, manure, subdrainage by means of tiles, and the growing and plowing under of sweet clover. Where sweet clover was grown, the second crop was plowed under in 1916 and the plat seeded to alfalfa.

TABLE XVI.—*Alkali reclamation experiments in growing sweet clover and alfalfa on field Y on the Newlands Experiment Farm in 1918.*

Plat.	Treatment.	Yield per acre (pounds).				
		First cutting.	Second cutting.	Total.	Treated plats. Average.	Treated plats. Increase over adjacent check plats.
No. 1	Tile, gypsum, manure, sweet clover	1,170	935	2,105	2,128	173
No. 2	Check	500	555	1,055		
No. 3	Tile, gypsum, manure, sweet clover	1,280	870	2,150		
No. 4	Tile, gypsum, manure	390	635	1,025	2,753	8
No. 5	Check	1,355	1,390	2,745		
No. 6	Tile, gypsum, manure	2,335	2,145	4,480		
No. 7	Gypsum, manure	2,055	2,270	4,325	3,818	693
No. 8	Check	1,690	1,735	3,125		
No. 9	Gypsum, manure	1,555	1,755	3,310		
No. 10	Gypsum	1,220	1,225	2,445	1,488	1,378
No. 11	Check	0	110	110		
No. 12	Gypsum	220	310	530		
No. 13	Tile, gypsum, manure, sweet clover	1,555	445	2,000	1,583	918
No. 14	Check	555	110	665		
No. 15	Tile, gypsum, manure, sweet clover	945	220	1,165		
No. 16	Sulphuric acid	345	220	565	543	543
No. 17	Check	0	0	0		
No. 18	Sulphuric acid	320	200	520		

The yields of the plats treated with gypsum and sulphuric acid have shown each year a decided increase over the untreated checks (Table XVI). The treatments have not, however, been sufficiently beneficial to raise the yield to the point of profitable production.

OUTLINE OF LABORATORY WORK.

The laboratory work conducted at the Newlands Experiment Farm has dealt with those problems in crop growth arising from the alkalinity or the physical condition of the soil. The reports of the laboratory studies are technical in character and have not been published in the annual reports of the experiment farm. A paper entitled "Effect on plant growth of sodium salts in the soil" has been published in the Journal of Agricultural Research (Vol. VI, No. 22).

Some of the specific problems worked out in the laboratory have been as follows:

(1) Determining the cause of the poor growth of field crops in the so-called "hard" or "slick" spots.

(2) Determination of the alkali content of field plats before and after various remedial treatments have been applied.

(3) Determination of the toxicity of various kinds of alkali salts.

(4) Determination of the relation of crop growth to alkalinity, colloidality, perviousness, and cementation of soils.

(5) Determination of the relation of alkali salts to the perviousness of soils.

(6) Determination of the value of various chemical treatments in rendering alkali soils more suitable for crop growth.

(7) Determination of the effectiveness of organic matter in absorbing sodium carbonate.

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